The evolving management of ruptured AAAs
An Australian centre experience

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Disclosure

Speaker name:
Dr. Cindy Wang
I do not have any potential conflict of interest
January 2010 – March 2018
Infrarenal AAA only
Elective open AAA = 30
Elective EVAR = 283
Method

- Retrospective - AVA, EMR, Ryerson Index
- Jan 2010-Mar 2018
- Included any patient who was operated on with a rAAA
- Excluded:
  - No procedure done
  - Suprarenal/mycotic/isolated iliac aneurysm
  - Previous endoluminal repair
  - Tender but UNruptured AAA
Results

Ruptured AAA by type of repair

- Endovascular
- Open
- Conversion
## Patient Characteristics

<table>
<thead>
<tr>
<th></th>
<th>Endo</th>
<th>Open</th>
<th>Conversion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean age</td>
<td>77+/-10</td>
<td>76+/-8</td>
<td>77 +/-4</td>
</tr>
<tr>
<td>Male</td>
<td>83%</td>
<td>89%</td>
<td>100%</td>
</tr>
<tr>
<td>IHD</td>
<td>43%</td>
<td>32%</td>
<td>33%</td>
</tr>
<tr>
<td>Diabetes</td>
<td>13%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>HTN</td>
<td>83%</td>
<td>68%</td>
<td>67%</td>
</tr>
<tr>
<td>Ex smoker</td>
<td>53%</td>
<td>53%</td>
<td>33%</td>
</tr>
<tr>
<td>Current smoker</td>
<td>20%</td>
<td>11%</td>
<td>0%</td>
</tr>
<tr>
<td>Create &gt;150</td>
<td>17%</td>
<td>11%</td>
<td>0%</td>
</tr>
</tbody>
</table>
Diameter of rAAA (mm)

Maximum diameter of ruptured AAAs at RNSH by surgery type

- Open: 85 mm
- EVG: 70 mm
- Conversion: 90 mm
Median length of surgery

*P-value = 0.086 between Open and Endo
<table>
<thead>
<tr>
<th></th>
<th>All</th>
<th>Endo</th>
<th>Open</th>
<th>Conversion</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Presentation to Tertiary</strong></td>
<td>21/52 (40%)</td>
<td>27/30 (73%)</td>
<td>10/19 (53%)</td>
<td>3/3 (100%)</td>
</tr>
<tr>
<td><strong>Transferred</strong></td>
<td>31/52 (60%)</td>
<td>8/30 (27%)</td>
<td>9/19 (47%)</td>
<td>0/3 (0%)</td>
</tr>
<tr>
<td><strong>In-hospital mortality</strong></td>
<td>12/52 (23%)</td>
<td>5/30 (17%)</td>
<td>5/19 (26%)</td>
<td>2/3 (67%)</td>
</tr>
<tr>
<td><strong>Median LOS(range)</strong></td>
<td>10(3-62)</td>
<td>8(3-32)</td>
<td>13(7-62)</td>
<td>22(-)</td>
</tr>
<tr>
<td><strong>GA</strong></td>
<td>40/52 (77%)</td>
<td>18/30 (60%)</td>
<td>19/19 (100%)</td>
<td>3/3 (100%)</td>
</tr>
<tr>
<td><strong>LA/sedation</strong></td>
<td>12/52 (23%)</td>
<td>12/30 (40%)</td>
<td>0/19 (0%)</td>
<td>0/3 (0%)</td>
</tr>
</tbody>
</table>

*Excluding those who died in hospital*
Outcomes in mortality by surgery type


- 3 prospective RCTs included.
- There was no difference between the 2 interventions on 30-day (or in-hospital) mortality, OR 0.91 (95% CI 0.67 to 1.22; p=0.52).
- Conclusions difficult due to lack of reporting in trials and overall paucity of data.

Figure 2  Short-term mortality (30-day or in-hospital) of emergency endovascular aneurysm repair (eEVAR) versus open repair.
<table>
<thead>
<tr>
<th>Time</th>
<th>No. at risk</th>
<th>Deaths</th>
<th>Survival</th>
<th>SE</th>
<th>Lower 95%</th>
<th>Upper 95%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-</td>
<td>Endovascular</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>In hospital</td>
<td>30</td>
<td>5</td>
<td>0.833</td>
<td>0.068</td>
<td>0.71</td>
</tr>
<tr>
<td></td>
<td>1 year</td>
<td>21</td>
<td>1</td>
<td>0.794</td>
<td>0.0755</td>
<td>0.659</td>
</tr>
<tr>
<td></td>
<td>3 years</td>
<td>12</td>
<td>1</td>
<td>0.728</td>
<td>0.0938</td>
<td>0.565</td>
</tr>
<tr>
<td></td>
<td>5 years</td>
<td>9</td>
<td>2</td>
<td>0.566</td>
<td>0.1244</td>
<td>0.368</td>
</tr>
<tr>
<td>-</td>
<td>Open</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>In hospital</td>
<td>19</td>
<td>5</td>
<td>0.737</td>
<td>0.101</td>
<td>0.563</td>
</tr>
<tr>
<td></td>
<td>5 years</td>
<td>5</td>
<td>2</td>
<td>0.442</td>
<td>0.172</td>
<td>0.206</td>
</tr>
</tbody>
</table>

Survival rate of RNSH rAAA patients by surgery type

Survival probability

Years

0.00
0.25
0.50
0.75
1.00

Years

p = 0.59
FIGURE 9 Kaplan–Meier estimates for overall survival, by randomised group. For (a) all 613 participants who were randomised (log-rank test $p = 0.40$); and (b) the 502 participants with a confirmed rupture for whom repair had started (log-rank test $p = 0.186$).
Survival rate of RNSH rAAA patients by transfer status

<table>
<thead>
<tr>
<th>Time</th>
<th>No. at risk</th>
<th>Deaths</th>
<th>Survival</th>
<th>SE</th>
<th>Lower 95%</th>
<th>Upper 95%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transferred</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In hospital</td>
<td>14</td>
<td>3</td>
<td>0.786</td>
<td>0.11</td>
<td>0.598</td>
<td>1</td>
</tr>
<tr>
<td>5 years</td>
<td>4</td>
<td>1</td>
<td>0.589</td>
<td>0.189</td>
<td>0.314</td>
<td>1</td>
</tr>
<tr>
<td>Tertiary</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In hospital</td>
<td>38</td>
<td>9</td>
<td>0.763</td>
<td>0.069</td>
<td>0.639</td>
<td>0.911</td>
</tr>
<tr>
<td>1 year</td>
<td>24</td>
<td>1</td>
<td>0.731</td>
<td>0.0731</td>
<td>0.601</td>
<td>0.89</td>
</tr>
<tr>
<td>5 years</td>
<td>13</td>
<td>4</td>
<td>0.506</td>
<td>0.1064</td>
<td>0.335</td>
<td>0.764</td>
</tr>
<tr>
<td>Time</td>
<td>No. at risk</td>
<td>Death</td>
<td>Survival</td>
<td>SE</td>
<td>Lower 95%</td>
<td>Upper 95%</td>
</tr>
<tr>
<td>------------</td>
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<td>----------</td>
<td>--------</td>
<td>-----------</td>
<td>-----------</td>
</tr>
<tr>
<td>GA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In hospital</td>
<td>40</td>
<td>10</td>
<td>0.75</td>
<td>0.0685</td>
<td>0.627</td>
<td>0.897</td>
</tr>
<tr>
<td>5 years</td>
<td>10</td>
<td>4</td>
<td>0.45</td>
<td>0.1232</td>
<td>0.263</td>
<td>0.77</td>
</tr>
<tr>
<td>LA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In hospital</td>
<td>12</td>
<td>2</td>
<td>0.833</td>
<td>0.108</td>
<td>0.647</td>
<td>1</td>
</tr>
<tr>
<td>1 year</td>
<td>10</td>
<td>1</td>
<td>0.75</td>
<td>0.125</td>
<td>0.541</td>
<td>1</td>
</tr>
<tr>
<td>3 years</td>
<td>5</td>
<td>1</td>
<td>0.6</td>
<td>0.167</td>
<td>0.347</td>
<td>1</td>
</tr>
</tbody>
</table>

Survival rate of RNSH rAAA patients by anaesthesia type

\[ p = 0.77 \]
Open vs Endo trends by year

The Erasmus University Medical Center Experience: endovascular versus open surgical repair of ruptured AAAs (1991 – 2012)

Conclusion

• Short and long term survival of rEVAR is comparable to open surgery – sometimes better
• Patients have shorter median duration of surgery time and LOS
• As better endograft design and technology emerge, more rAAAs will be suitable for EVAR
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